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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,684	10/24/2001	D. Gregory More	102175-200	4640

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EXAMINER

KYLE, MICHAEL J

ART UNIT	PAPER NUMBER
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3676

DATE MAILED: 11/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/002,684

Applicant(s)

MORE ET AL.

Examiner

Michael J Kyle

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 21-31 is/are pending in the application.
- 4a) Of the above claim(s) 28 and 29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 21-27, 30 and 31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Election/Restrictions

2. Newly submitted claims 28 and 29 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 28 and 29 are directed to the species shown in figure 3. The rest of the claims are directed to the species shown in figure

2.

3. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 28 and 29 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-7, 9, 22, 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halling (U.S. 5,249,814) in view of Harada ("Alloy Design for Nickel-Base Superalloys").

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6. Halling discloses an annular seal having a central longitudinal axis forming a seal between interior and exterior volumes (56, 62) when compressed between opposed first and second parallel faces (52, 58). The seal comprises metallic first (14) and second (12) layers where the second layer is integrated with the first layer (column 4, lines 14-17). The first layer is cold formable. The layers extend continuously between first and second portions (40a, 42a) where only the second layer contacts the exterior volume. The seal has a radial section of bellows-like structure. The first and second layers each have first and second surfaces (one surface exposed, the other surface in contact with the other layer). The second layer (12) is integrated by adhesion between the surfaces. Halling discloses the layers as being welded, or fusion bonded by other means, such as brazing (column 4, lines 44-45). Merriam-Websters Collegiate Dictionary, Tenth Edition, defines "Adhesion" as "steady or firm attachment". Welding fits this definition. While the welds are at the ends of the seal, the surfaces are still firmly attached together. Additionally, Halling discloses the first layer (14) first (exposed) and second surfaces (contacting second layer) are substantially inner and outer surfaces, respectively, and the second layer first (contacting first layer) and second surfaces (exposed) are substantially inner and outer surfaces, respectively, wherein a major portion of the second surface of the second layer constitutes an external sealing surface.

7. Halling fails to expressly disclose nickel-based superalloys within the layers. However, Harada teaches the use of nickel-based superalloys for use in gas turbines for the purpose of providing increased creep rupture strength, tensile property, and hot corrosion resistance. Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Halling's seal layers to consist of a nickel-based superalloy for the purpose of

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providing increased creep rupture strength, tensile property, and hot corrosion resistance as taught by Harada.

8. Although Halling discloses that the first and second layers can be made of different materials in order to provide a sealing ring having specific mechanical properties on a specific layer as desired (column 4, lines 22-26), Halling fails to disclose the second layer as having a higher resistance to stress relaxation than the first layer, or that the second layer consists of a cast gamma' hardened nickel based superalloy.

9. Hardada discloses the use of a cast gamma' hardened nickel-based superalloy (MAR-M247) within a gas turbine because of the cast gamma' hardened material's superior "creep rupture strength, tensile properties, and hot corrosion resistance [in comparison] to that of commercial alloys". Thus the cast gamma' hardened superalloy as taught by Harada has a higher resistance to stress relaxation/creep than that of commercial nickel-based alloys. Furthermore, since Halling teaches that one layer can be made of a different material than the other layer, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the second or outer layer to include a cast gamma' hardened nickel-based superalloy for the purpose of increasing the creep rupture strength, tensile property, and hot corrosion resistance of the second layer of the seal.

10. With respect to claims 6 and 25, Halling discloses that the span and compressive strength of the seal depends on the thickness and number of plies within the seal (column 4, line 59). Thus, since the combination of Halling and Harada discloses applicant's invention having similar material configuration, thickness, number of plies, and geometry, the resulting seal would also inherently satisfy the limitation of claims 6 and 25.

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11. Claims 8, 21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halling in view of Harada as applied to the claims above, and further in view of Rynders et al (U.S. Patent No. 6,302,402). The combination of Halling and Harada fails to disclose a target operating condition within applicant's specified range. Rynders teaches an annular seal (figure 6g) which operates at a target thermal condition from 871 degrees C – 1093 degrees C (column 4, lines 58) for the purpose of permitting the seal to operate through multiple thermal cycles (abstract) without cracking for use in high-temperature applications. It would have been obvious to one having ordinary skill in the art at the time of applicant's invention to create an annular seal capable of withstanding higher temperatures in the range specified by applicant for the purpose of operating the seal through multiple thermal cycles without cracking in an environment where the material to be sealed have different coefficients of thermal expansion.

12. With respect to claim 21, the creep resistance of the seal made with Harada's materials will be greater than the creep resistance of cold-formed seals of like dimensions during thermal operating conditions. The combination of Halling and Harada discloses applicant's invention except for the creep resistance as being greater specifically at 982 degrees C, but it would have been obvious to one having ordinary skill in the art at the time the invention was made to reach this temperature within a gas turbine as taught by Rynders et al, for the purposes stated above.

Response to Arguments

13. Applicant's arguments filed November 10, 2003 have been fully considered but they are not persuasive. Applicant argues that there is no motivation to combine Halling and Harada, stating that there is no suggestion to use to claimed material in a seal. Examiner respectfully

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disagrees with this argument. Examiner recites the motivation for combining Halling and Harada to be for the purpose of providing increased creep rupture strength, tensile property, and hot corrosion resistance. This reasoning is explicitly stated by Harada on page 1, under the "Introduction" heading. For the reasons listed by Harada, examiner considers obvious to use that material for an application.

14. Applicant argues Rynders teaches away from the combination of Halling and Harada, and that a source of motivation for such a combination is provided. Examiner respectfully disagrees. Rynders is cited to show the capability of a metal seal in the claimed temperature environment. Rynders provides a motivation for why such a temperature range would be desirable (for the purpose of permitting the seal to operate through multiple thermal cycles without cracking for use in high-temperature applications). This motivation is provided in the abstract.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

16. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J Kyle whose telephone number is 703-305-3614. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

18. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 703-308-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9326.

19. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-2168.

mk



Anthony Knight
Supervisory Patent Examiner
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